

REMARKS

Status of Claims

The present Amendment is being filed together with a Request for Continued Examination under 37 C.F.R. §1.114.

Claims 1-10 are pending in this application, the independent claims being claims 1, 6, and 7. By this Amendment, claim 11 is canceled and claims 1, 6 and 7 are amended.

Summary of Official Action

In the Official Action, claims 1-11 were rejected under 35 U.S.C. §103(a), as unpatentable over U.S. Patent No. 6,013,339 to Yamada in view of U.S. Patent No. 6,738,124 (Park).

Reconsideration and withdrawal of the rejection respectfully are requested in view of the above amendments and the following remarks.

Claim Amendments

The rejection of the claims over the cited art respectfully is traversed. Nevertheless, without conceding the propriety of the rejection, claim 11 has been canceled without prejudice to or disclaimer of the subject matter recited therein, and claims 1, 6 and 7 have been amended more clearly to recite various novel features of the claimed invention. Support for the amendments may be found in the original application. No new matter has been added.

Claimed Invention

The present invention relates to a novel liquid crystal device and methods of making a liquid crystal device. In one aspect, as recited in claim 1, the claimed invention relates to a liquid crystal device comprising a pair of substrates, a liquid crystal layer provided between the pair of substrates, a sealing material bonding the pair of substrates to each other and enclosing the liquid crystal layer between the pair of substrates, and at least one of a color filter and a metal wire. The sealing material contains a photocurable component and a

thermosetting component; the photocurable component has a maximum curing rate in the range of from 60% to 95%, and the thermosetting component has a curing rate in the range of from 60% to 90%. The color filter and/or metal wire of the liquid crystal device is disposed at a position corresponding to the sealing material, where the color filter and/or metal wire at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the color filter and/or metal wire has a curing rate of less than 60%.

In another aspect, as recited in independent claim 6, the claimed invention relates to a method for manufacturing a liquid crystal device including a pair of substrates, a liquid crystal layer provided between the pair of substrates, an adhesive that frames the liquid crystal layer, and at least one of a color filter and a metal wire that blocks ultraviolet light. The method comprises the steps of applying the adhesive onto at least one of surfaces of the pair of substrates to form a closed frame shape in a region of the surface thereof, disposing spacers on at least one of the surfaces of the pair of substrates, dripping liquid crystal onto at least one of surfaces of the pair of substrates after the adhesive and the spacers are disposed, bonding the pair of substrates to each other after the liquid crystal is dripped, and curing the adhesive after the bonding is performed, where the adhesive is an uncured material which is formed to a sealing material by curing, the sealing material contains a photocurable component and a thermosetting component, the photocurable component has a maximum curing rate in the range of from 60% to 95%, and the thermosetting component has a curing rate in the range of from 60% to 90%. The method further comprises the step of disposing the color filter or metal wire of the liquid crystal device at a position corresponding to the sealing material, where the color filter or metal wire at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the color filter or metal wire has a curing rate of less than 60%.

In another aspect, as recited in independent claim 7, the claimed invention also relates to a method for manufacturing a liquid crystal device including a pair of substrates, a liquid crystal layer provided between the pair of substrates, an adhesive that frames the liquid crystal layer, and at least one of a color filter and a metal wire that at least partially blocks ultraviolet light. In this aspect, the method comprises the steps of applying the adhesive onto at least one of the surfaces of the pair of substrates to form a frame shape provided with a liquid crystal inlet, disposing spacers on at least one of the surfaces of the pair of substrates, bonding the pair of substrates to each other after the adhesive and the spacers are disposed, curing the adhesive after the bonding is performed, and injecting liquid crystal inside the adhesive through the liquid crystal inlet, where the adhesive is an uncured material which is formed to a sealing material by curing, the sealing material contains a photocurable component and a thermosetting component, the photocurable component has a maximum curing rate in the range of from 60% to 95%, and the thermosetting component has a curing rate in the range of from 60% to 90%. The method further comprises the step of disposing the color filter or metal wire at a position corresponding to the sealing material, where the color filter or metal wire at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the color filter or metal wire have a curing rate of less than 60%.

Thus, in each aspect the claimed invention relates to a liquid crystal structure/method including a combination of features in which *at least one of a color filter and a metal wire of the liquid crystal device is disposed at a position corresponding to the sealing material,* where the color filter or metal wire at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the color filter or metal wire has a curing rate of less than 60%, **AND** the sealing material contains a photocurable component and a thermosetting component, where the photocurable component

has a maximum curing rate in the range of from 60% to 95%, and the thermosetting component has a curing rate in the range of from 60% to 90%. As discussed in greater detail in the present application, this combination of features provides a significant advantage over prior art structures and methods because it permits efficient utilization of space for arranging light blocking members of the liquid crystal device (e.g., color filters and metal wires) and provides desired sealing qualities (strength, flexibility, non-brittle, non-separation, etc.) of the sealing material.

Prior Art Distinguished

The rejection of claims 1-11 over the Yamada '339 patent and the Park '124 patent respectfully is traversed.

Applicant submits that the prior art fails to anticipate the claimed invention. Moreover, Applicant submits that there are differences between the subject matter sought to be patented and the prior art, such that the subject matter taken as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.

In particular, Applicant submits that the applied art, taken individually or in combination, fails to disclose or suggest the features of a liquid crystal device comprising at least one of a color filter and a metal wire disposed at a position corresponding to the sealing material, where the color filter or metal wire at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the color filter or metal wire has a curing rate of less than 60%; nor is the cited art understood to disclose or suggest this feature in combination with the features wherein the sealing material contains a photocurable component and a thermosetting component, where the photocurable component has a maximum curing rate in the range of from 60% to 95%, and the thermosetting component has a curing rate in the range of from 60% to 90%, as disclosed in the present application and recited in claim 1. Nor is the applied art understood to teach a

method for manufacturing such a liquid crystal device, as disclosed in the present application and recited in claims 6 and 7.

The Yamada '339 patent relates to a liquid crystal display panel, a seal material for a liquid crystal cell, and a liquid crystal display, and discloses a liquid crystal display including substrates 12A, 12B, a seal material 3, spacer material 2, and liquid crystal 13 (Figs. 5 and 8). The Yamada '339 patent teaches that by using a sealing material including an ultraviolet ray curing type component and a thermosetting type component, ultraviolet ray curing to provide a curing ratio of 60% or more of the ultraviolet ray curing resin in the sealing material (with a particle type thermosetting agent, the curing ratio is 50% or more), and thermosetting to increase the curing ratio to 80% or more of the curing resin in the seal material, a liquid crystal display panel having a good display property can be obtained (col. 15, lines 66-col. 16, line 9). However, Applicant submits that the Yamada '339 patent fails to disclose or suggest at least the above-described combination of features of the claimed invention. As acknowledged in the Official Action, the Yamada '339 patent fails to disclose or suggest the feature of a sealing material having a maximum cure rate in the range of 60% - 95%. Nor does the Yamada '339 patent disclose or suggest a liquid crystal device including at least one of a color filter or a metal wire at a position corresponding to the sealing material, where the color filter or metal wire at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material that correspond to the color filter or metal wire has a curing rate of less than 60%.

The Park '124 patent relates to a method for fabricating a liquid crystal display panel, and discloses a fabrication method using a mask member. However, Applicant submits that the Park '124 patent fails to disclose or suggest at least the above-discussed features of the claimed invention. Nowhere does the Park '124 patent to disclose or suggest the feature a liquid crystal device including at least one of a color filter and metal wire

disposed at a position corresponding to the sealing material, where the color filter or metal wire at least partially blocks ultraviolet rays so that the photocurable component at portions of the sealing material corresponding to the color filter or metal wire has a curing rate of less than 60%, as disclosed in the present application and recited in claims 1, 6 and 7. Nor is the Park '124 patent believed to add anything to the Yamada '339 patent that would make obvious the claimed invention.

For at least the above reasons, Applicant submits that claims 1, 6 and 7 are allowable.

Claims 2-5 and 8-10 depend from claims 1 and 6, and are believed allowable for the same reasons. Moreover, each of these dependent claims recites additional features in combination with the features of its respective base claim, and is believed allowable in its own right. Individual consideration of the dependent claims respectfully is requested.

Conclusion

Applicant believes that the present Amendment is responsive to each of the points raised by the Examiner in the Official Action, and submits that the application is in condition for allowance. Favorable reconsideration of the claims and passage to issue of the application at the Examiner's earliest convenience earnestly are solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact the undersigned at the telephone number set forth below.

Respectfully submitted,

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